

REMARKS

This is intended as a full and complete response to the Final Office Action dated December 30, 2003, having a shortened statutory period for response set to expire on March 30, 2004. Claims 19, 20, 22-27, 32-40 and 96-99 are pending in the application. Claims 19, 20, 22-27, 32-40 and 96-97 stand rejected. Claims 98 and 99 are objected to as being dependent upon a rejected base claim and, in this response, have been rewritten to be in independent form including all of the limitations of the base claim and any intervening claims. Claims 19, 32, and 96 have been amended for clarity reasons. Previously amended claims 26 and 37 have been canceled. Original claims 26 and 37 have been added as new claims 100 and 101. No new matter has been added. Please reconsider the claims pending in the application for reasons discussed below.

Applicants wish to thank the Examiner for her time in conducting an Examiner Interview with the Eddy Song on February 27, 2004.

Claims 19-20, 22-25 and 35-36 stand rejected under 35 U.S.C. § 103(a) as being anticipated by U.S. Patent No. 4,557,785 (*Ohkuma*) on grounds that *Ohkuma* discloses a fluid filled area between the cover and the substrate and that it would have been obvious to form a thickness of a gap between the cover and the substrate to a thickness between about 0.5 millimeter and about 4 millimeters by optimizing a range through routine experimentation. Applicants respectfully traverse this rejection.

First, *Ohkuma* does not teach, show or suggest an apparatus adapted to support a substrate contacting a substrate support. *Ohkuma* discloses that an object of *Ohkuma* is to provide an apparatus for wet processing, such as washing or etching, which can process both sides of a substrate at the same time. (See, Fig. 3A; col. 2, Ins. 6-8.) The *Ohkuma* apparatus includes a pedestal 11 and a cover 12 forming a circular processing chamber 13. (See, Fig. 3A; col. 3, Ins. 1-4.) Processing liquid is spouted by a pump from an opening 15 at the center of the pedestal 11 to lift and support substrate 14 by a stream of process liquid while additional processing liquid is poured or sprayed over the surface of the substrate 14 through an opening 20 in the cover 12. (See, Fig. 3A; col. 3, Ins. 1-4; col. 3, Ins. 26-61.) Since the purpose of *Ohkuma* is to process both sides of the substrate, *Ohkuma* teaches away from an apparatus adapted to support a substrate contacting a substrate support.

Second, it would not have been obvious to form a thickness of a gap between the evaporation shield and the substrate to a thickness between about 0.5 millimeter and about 4 millimeters. The rejection cites *In re Aller* for the proposition that it is not inventive to discover the optimum or workable ranges by routine experimentation. See, 200 F.2d 454, 456 (CCPA 1955). In contrast, *In re Antonie* provides that a particular parameter must first be recognized as a result-effective variable, i.e., a variable which achieves a recognized result, before the determination of the optimum or workable ranges of the variable might be characterized as routine experimentation. See, 559 F.2d 618 (CCPA 1977), MPEP 2144.05. *Ohkuma* does not disclose or suggest providing a narrow thickness between an evaporation shield with respect to a substrate. Rather, *Ohkuma* discloses that the flows A, B, C of the apparatus are controlled to keep the substrate in the middle of the processing chamber 13. (See, Fig. 3; Col. 4, lns. 10-25.) *Ohkuma* suggests that any distance between the cover 12 and the substrate 14 would suffice as long as the substrate is in the center of the processing chamber 13. Thus, *Ohkuma* does not recognize that a narrow distance between the cover 12 and the substrate 14 would achieve a recognized result. Therefore, an evaporation shield positioned over a substrate support to form a gap having a thickness between about 0.5 millimeter and about 4 millimeters is not obviousness due to routine experimentation under *In re Antonie*. As a consequence, Applicants respectfully submit that the claims are in condition for allowance and respectfully request allowance of the claims.

Claim 26 stands rejected under 35 U.S.C. § 103(a) over *Ohkuma* in view of U.S. Patent No. 4,821,675 (*Ikeno et al.*) on grounds that it would have been obvious to have provided an evaporation shield/cover/lid adapted to provide heat to a fluid layer in a substrate processing apparatus in *Ohkuma* in order to restrain temperature variation of the fluid as taught by *Ikeno et al.* Claim 26 has been canceled. Applicants respectfully submit that the rejection has been obviated.

Claim 27 stands rejected under 35 U.S.C. § 103(a) over *Ohkuma* as applied to claims 19-20, 22-25, and 35-36 above and further in view of *Sotralentz* (German Patent No. 29922090U1) on grounds that it would have been obvious to one of skill in the art to have provided an evaporation shield comprising a degassing membrane in *Ohkuma* in order to provide a container capable of simple and effective degassing as taught by

Sotralentz. Applicants respectfully traverse this rejection on grounds that the claimed subject matter is not obvious from the combination of *Ohkuma* and *Sotralentz*.

To establish prima facie obviousness of a claimed invention, all the claimed limitations must be taught or suggested by the prior art. See, *In re Royka*, 490 F.2d 981, 180 USPQ 580 (CCPA 1974). Obviousness can only be established by combining or modifying the teachings of the prior art to produce the claimed invention where there is some teaching, suggestion, or motivation to do so found either in the references themselves or in the knowledge generally available to one of ordinary skill in the art. See, *In re Fine*, 837 F.2d 1071, 5 USPQ2d 1596 (Fed. Cir. 1988); *In re Jones*, 958 F.2d 347, 21 USPQ2d 1941 (Fed. Cir. 1992); MPEP 2143.01. "One cannot use hindsight reconstruction to pick and choose among isolated disclosures in the prior art to deprecate the claim invention." See, *In re Fine*, 837 F.2d 1071, 5 USPQ2d 1596, 1600 (Fed. Cir. 1988).

Ohkuma discloses an apparatus for washing or etching substrate. (See, Fig. 3A; col. 3, Ins. 1-4.) *Sotralentz* discloses a container having a degassing membrane for storage and the transport of liquids with various viscosities, as well as dry granular and powder materials. (See, English Abstract.) *Ohkuma* does not teach or suggest any need for degassing of the cleaning or etching fluids used in the apparatus of *Ohkuma*. *Sotralentz* does not teach or suggest that a degassing membrane would be useful for degassing of fluids used in processing of substrates. The rejection relies on the teachings of the present application to pick and choose elements of the combined prior art to reject claim 27. Since no motivation exists in the references themselves for the combination, Applicants respectfully submit that the claims are in condition for allowance and respectfully request allowance of the claims.

Claims 32 and 33 stand rejected under 35 U.S.C. § 103(a) over *Ohkuma* in view of *Kennedy, Jr. et al.* (U.S. Patent 4,120,699) on grounds that it would have been obvious to provide a transducer coupled to an evaporation shield/top cover of the chamber in *Ohkuma* in order to cause acoustic waves with constructive interference that sweep over a substrate to be processed and result in the need for a shorter period of time to clean a substrate with an irregular surface as taught by *Kennedy, Jr. et al.*

Applicants respectfully traverse this rejection on grounds that the subject matter is not obvious from the combination of *Ohkuma* and *Kennedy, Jr. et al.*

Ohkuma discloses that an object of *Ohkuma* is to provide an apparatus for wet processing, such as washing or etching, which can process both sides of a semiconductor substrate. (See, Fig. 3A; col. 2, Ins. 6-8; col. 2, In. 64 to col. 3, In. 9.) (See, Fig. 3A; col. 3, Ins. 1-4.) *Kennedy et al.* discloses equally spacing apart transducers for cleaning pipes, tubes, and vessels, such as heat exchangers, which are routinely impeded by buildup of sediment, or the cleaning of irregular surfaces, such as engine blocks. (See, col. 1, Ins. 27-44; col. 4, Ins. 22-25.) *Ohkuma* does not teach or suggest that additional agitation is useful. *Kennedy et al.* does not teach or suggest processing of disk shaped objects, such a semiconductor wafers. The rejection relies on the teachings of the present application to pick and choose elements of the combined prior art to reject claims 32-33. Since no motivation exists in the references themselves for the combination, Applicants respectfully submit that the claims are in condition for allowance and respectfully request allowance of the claims.

Claim 34 stands rejected under 35 U.S.C. § 103(a) over *Ohkuma* and *Kennedy, Jr. et al.* as applied to claims 32 and 33 above, and further in view of *Hembree et al.* (U.S. Patent No. 6,224,713) on grounds that it would have been obvious to one of ordinary skill in the art to have provided a submersible rod for mounting a transducer in *Ohkuma* and *Kennedy, Jr. et al.* to prevent the need for bringing the transducer in direct contact with a processing solution as taught by *Hembree et al.* Applicants respectfully traverse this rejection.

Ohkuma discloses an apparatus for wet processing of a substrate, such as washing or etching a substrate. The apparatus includes a pedestal 11 and a cover 12 forming a circular processing chamber 13 to house a substrate 14. (See, Fig. 3A; col. 3, Ins. 1-4.) *Kennedy et al.* discloses equally spacing apart transducers for cleaning pipes, tubes, and vessels, such as heat exchangers, which are routinely impeded by buildup of sediment or the cleaning of irregular surfaces, such as engine blocks. (See, col. 1, Ins. 27-44; col. 4, Ins. 22-25.) *Hembree et al.* discloses an etch tank 20 and a transducer mounted on a submersible rod 34 disposed directly within the etch tank 20. (See, Fig. 5.) The rod 34 is positioned away from the wafer boat 24 (See, Fig. 5.) The references,

alone or in combination, do not teach, show, or suggest a transducer comprising a rod disposed on an evaporation shield disposed over a substrate support. As a consequence, Applicants respectfully submit that the claims are in condition for allowance and respectfully request allowance of the claims.

Claim 37 stands rejected under 35 U.S.C. § 103(a) over *Ohkuma* in view of *Motoda et al.* (U.S. Patent No. 5,906,860) on grounds that it would have been obvious to have provided separate rotation for a lid/cup combination and substrate support in *Ohkuma* in order to permit efficient rotation of a spin chuck and improved throughput and product yield as taught by *Motoda et al.* Applicants have cancelled claim 37 and respectfully submit that the objection has been obviated.

Claim 38 stands rejected under 35 U.S.C. § 103(a) over *Ohkuma* in view of *Chao et al.* (U.S. Patent No. 5,316,591) on grounds that it would have been obvious to have provided a fluid agitation component disposed on the bottom surface of *Ohkuma* in order to provide cavitation-producing means that remove undesired material from a substrate as taught by *Chao et al.* Applicants respectfully traverse this rejection.

Ohkuma discloses that an object of *Ohkuma* is to provide an apparatus for wet processing, such as washing or etching, which can process both sides of a substrate at the same time. (See, Fig. 3A; col. 2, Ins. 6-8.) The *Ohkuma* apparatus includes a pedestal 11 and a cover 12 forming a circular processing chamber 13. (See, Fig. 3A; col. 3, Ins. 1-4.) *Chao* discloses a extractor/cleaning vessel 10. (See, Fig. 1, col. 3, Ins. 35-54.) Neither *Ohkuma* nor *Chao* discloses fluid agitation components of channels, veins, or protrusions. As a consequence, Applicants respectfully submit that the claims are in condition for allowance and respectfully request allowance of the claims.

Claims 39-40 stand rejected under 35 U.S.C. § 103(a) over *Ohkuma* as applied to claims 19-20, 22-25, 35-36 and further in view of *Christini et al.* (U.S. Patent No. 3,853,094) on grounds that it would have been obvious to provide an evaporation shield comprising polymeric material in *Ohkuma* in order to take advantage of the material's anti-corrosion properties as taught by *Christini et al.* Applicants respectfully submit that claim 39-40 depend on allowable claim 19 as discussed above and respectfully submit that the claims are in condition for allowance. Withdrawal of the rejection is respectfully requested.

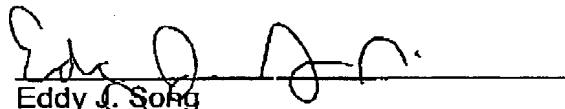
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Claims 96 and 97 stand rejected under 35 U.S.C. § 103(a) over *Ohkuma* in view of *Sotralentz* on grounds that it would have been obvious to have provided an evaporation shield comprising a degassing membrane in *Ohkuma* in order to provide a container capable of simple and effective degassing as taught by *Sotralentz*. Applicants respectfully traverse this rejection.

Ohkuma discloses an apparatus for washing or etching substrates. (See, Fig. 3A; col. 3, Ins. 1-4.) *Sotralentz* discloses a container having a degassing membrane for storage and the transport of liquids with various viscosities, as well as dry granular and powder materials. (See, Abstract) *Ohkuma* does not teach or suggest any need for degassing of the cleaning or etching fluids used in the apparatus of *Ohkuma*. *Sotralentz* does not teach or suggest that a degassing membrane would be useful for degassing of fluids used in processing of substrates. The rejection relies on the teachings of the present application to pick and choose elements of the combined prior art to reject claims 96-97. Since no motivation exists in the references themselves for the combination, Applicants respectfully submit that the claims are in condition for allowance and respectfully request allowance of the claims.

In conclusion, the references cited by the Examiner, alone or in combination, do not teach, show, or suggest the invention as claimed. Having addressed all issues set out in the office action, Applicant respectfully submits that the claims are in condition for allowance and respectfully request that the claims be allowed.

Respectfully submitted,



Eddy J. Song
Registration No. 43,144
MOSER, PATTERSON & SHERIDAN, L.L.P.
3040 Post Oak Blvd. Suite 1500
Houston, TX 77056
Telephone: (713) 623-4844
Facsimile: (713) 623-4846
Agent for Applicants

Page 11

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